Glenn Research Center
Centralized Office Building

Preliminary Design Review (PDR)

May 14, 2009
NASA Facilities Engineering & Real Property Symposium
Langley Research Center

Glenn Research Center
Facilities Division
Lewis Field & Plum Brook Station

Why Is Glenn Doing a PDR?

- **Introduction by Mark Woodling**

- **GRC Centralized Office Building (COB)**
  - Repair by Replacement Office Building
  - Awarded through the SII Program in FY08

- **GRC advocacy for this project**
  - **Evaluation Factor 4: Management Approach**
    "Glenn will initiate the creation of an independent, third party team to perform a Preliminary Design Review (PDR) and a Critical Design Review (CDR) during the design phase of the project. The function of this PDR/CDR Team will be to review and control the project Requirements Document and ensure that all critical requirements are addressed by the final design. Glenn will request participation from NASA Headquarters and other field centers for this team."

Why Is Glenn Doing a PDR?

- **Multiple Centers have been awarded Repair by Replacement Buildings**
  - Conformance to newly approved Center Master Plans
  - LEED Silver (minimum) and conform to stringent Energy Usage mandates
  - Utilize Building Information Modeling (BIM)

  Hope to draw upon lessons learned from other Centers implementing new buildings!

- **Provide awareness to NASA Headquarters**

The Process for PDR

- **GRC Master Plan**
  Joe Morris, GRC Chief Architect
  - Overview of Approved Glenn Master Plan
  - Define the site for the Centralized Office Building

- **Preliminary Design Review Presentation**
  Eric Patton, GRC PM for the Centralized Office Building
  Michael Carter, PM from Burt, Hill (A/E Firm)
  - Identify project requirements
  - How does the preliminary design meet the requirements
  - Preliminary features of the Centralized Office Building

The Process for PDR

- **Established PDR Review Team**
  - Steve Rider, HQ/FERPD (Program Manager for GRC)
  - Rhonda Pepper, MSFC/AS21 ( )
  - Soheila Dianati, ARC/JCE ( )
  - Ralph Allen, MSFC/xxx ( )
  - David Larson, GSFC

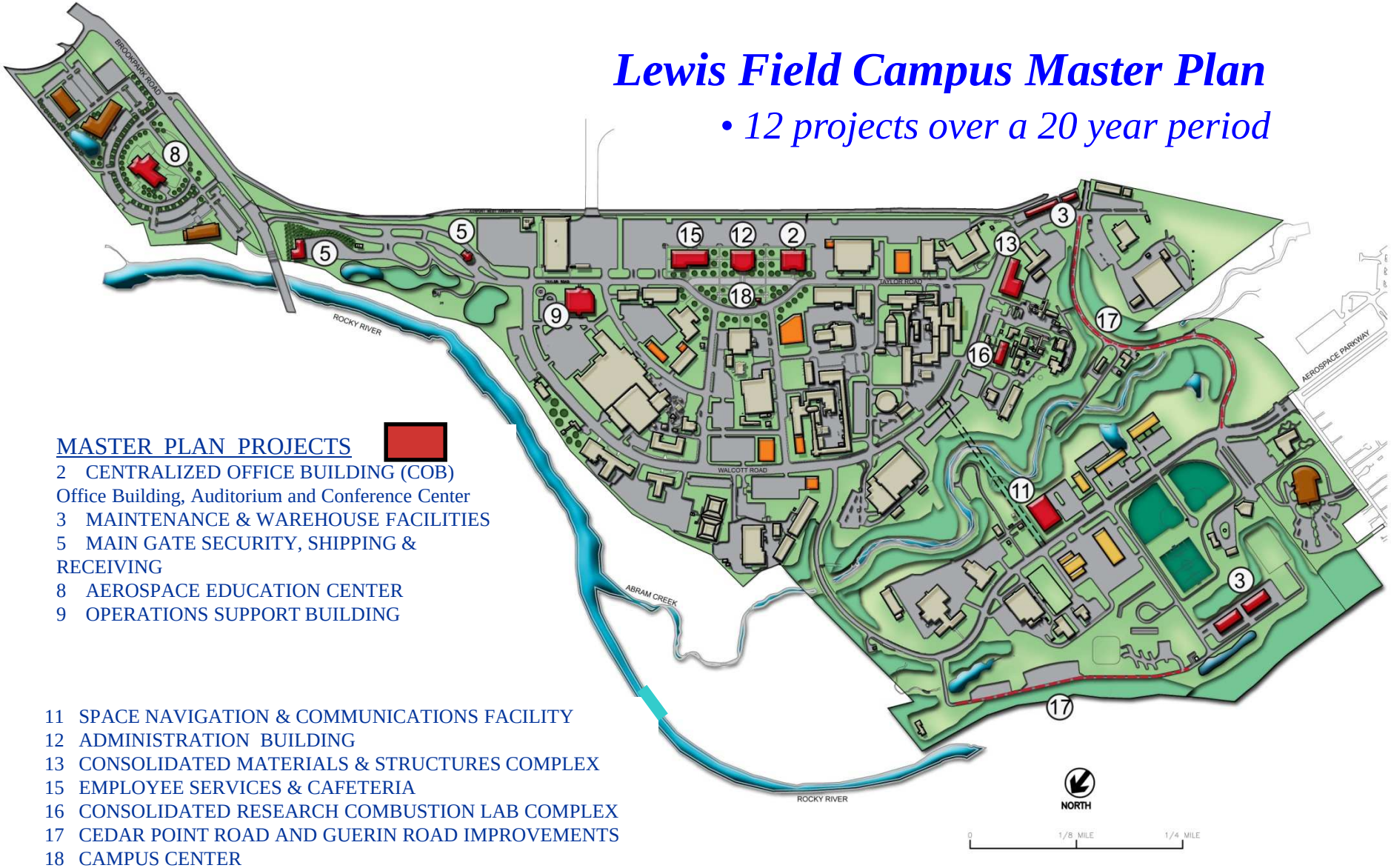
- **During PDR, only PDR Team to ask formal questions**
  - Questions from the general assembly can be addressed after the presentation

- **PDR Team can ask formal questions**
  - RFA Forms provided
  - Formal answers returned at Critical Design Review

Lewis Field Campus Master Plan – Presented by Joe Morris

Lewis Field Campus Master Plan

- *12 projects over a 20 year period*



MASTER PLAN PROJECTS

2 CENTRALIZED OFFICE BUILDING (COB)
Office Building, Auditorium and Conference Center
3 MAINTENANCE & WAREHOUSE FACILITIES
5 MAIN GATE SECURITY, SHIPPING & RECEIVING
8 AEROSPACE EDUCATION CENTER
9 OPERATIONS SUPPORT BUILDING

11 SPACE NAVIGATION & COMMUNICATIONS FACILITY
12 ADMINISTRATION BUILDING
13 CONSOLIDATED MATERIALS & STRUCTURES COMPLEX
15 EMPLOYEE SERVICES & CAFETERIA
16 CONSOLIDATED RESEARCH COMBUSTION LAB COMPLEX
17 CEDAR POINT ROAD AND GUERIN ROAD IMPROVEMENTS
18 CAMPUS CENTER

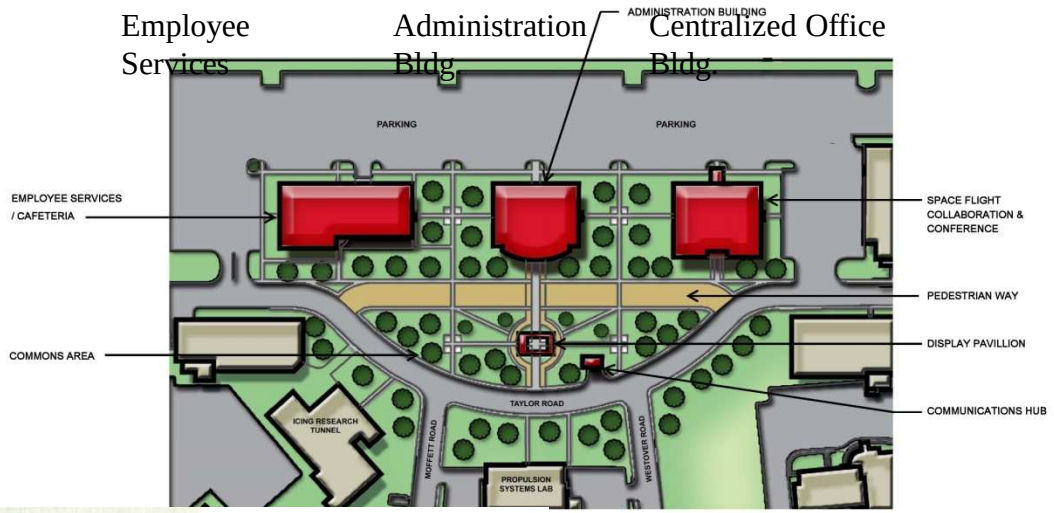
Facility Goals

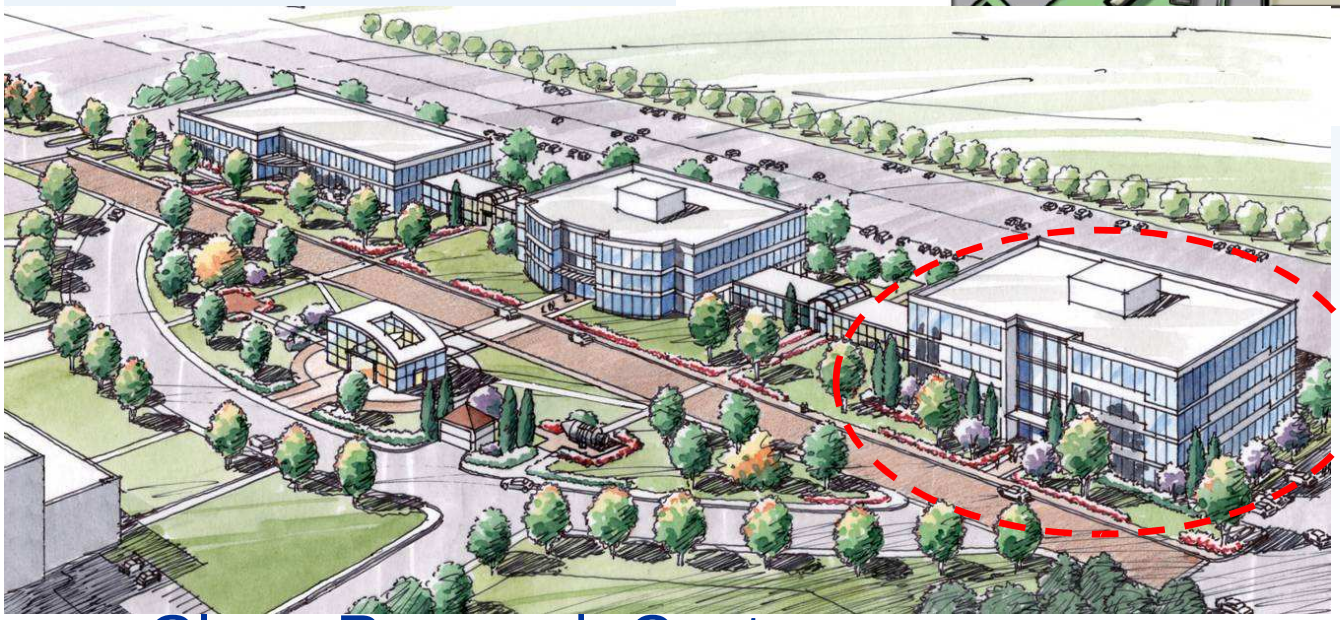
1. *Infrastructure + Cost reduction*
2. *Security*
3. *Prepare for Space Flight work*
4. *Public outreach*
5. *Improve campus image*

Lewis Field Campus Master Plan Concept

New Campus Center at Lewis Field

Figure 6.3 Campus Center Plan





90,000 sq. ft. LEED Silver

400 seats, 6000 sq. ft.

7 Meeting Rooms

Displays, Events and Gatherings

300+ desks

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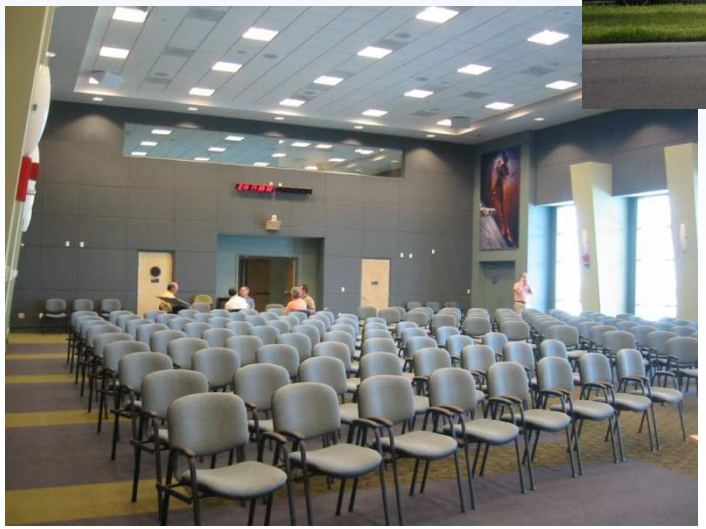
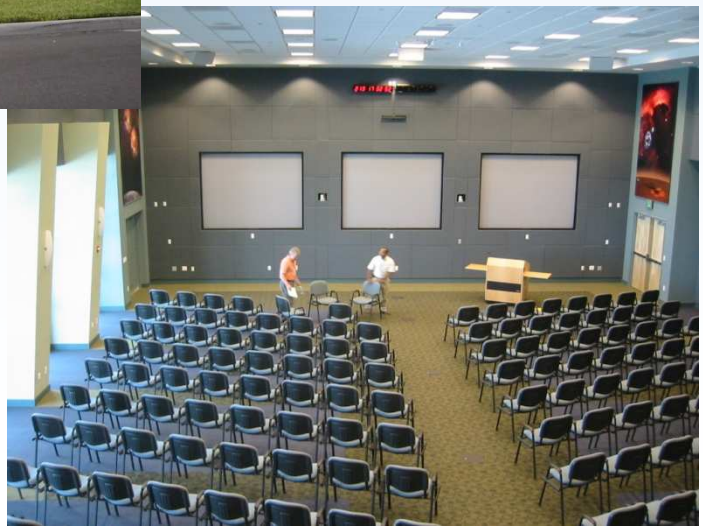
Lewis Field & Plum Brook Station

Building Concepts similar to KSC OSB2





Project Site

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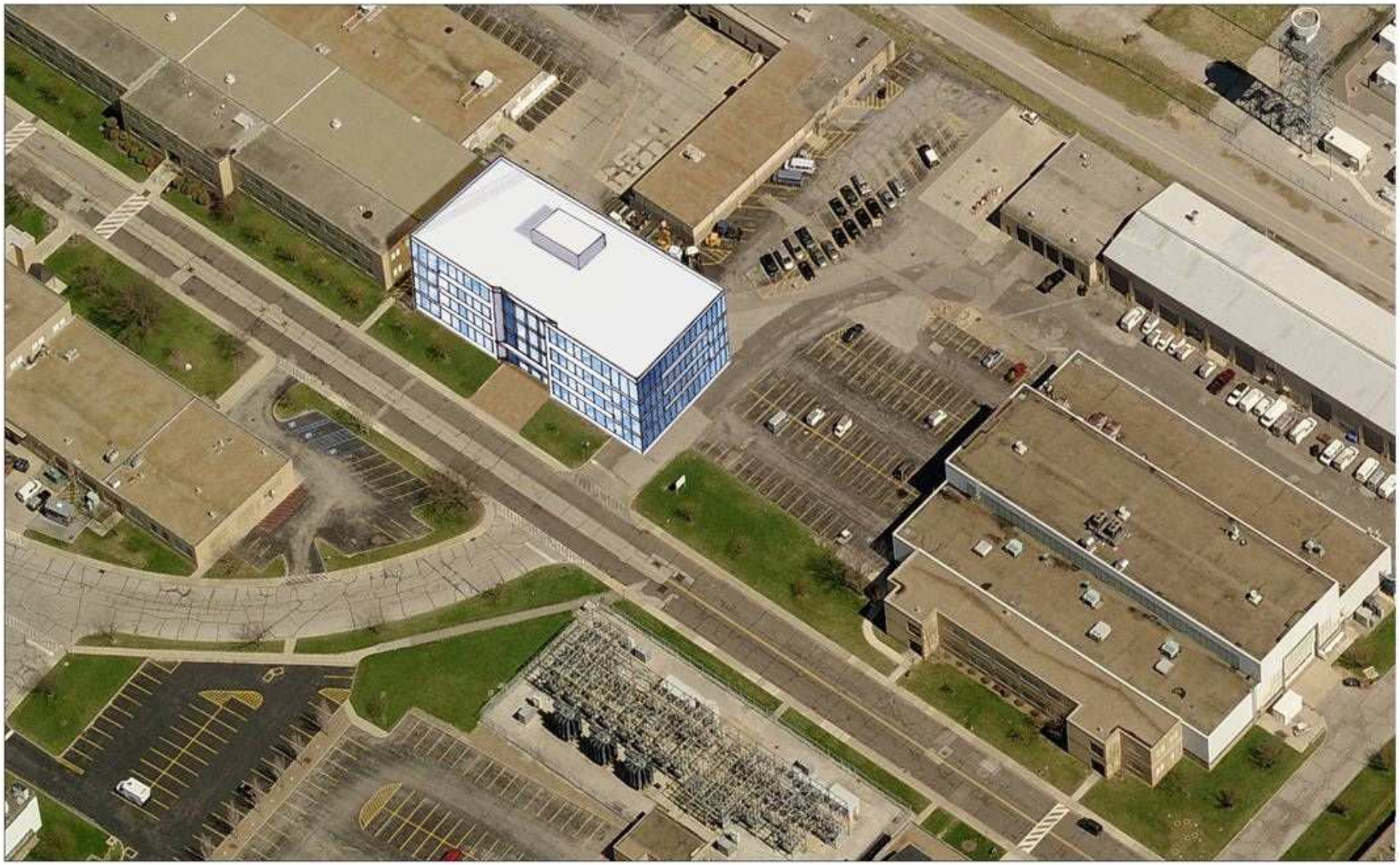
Lewis Field & Plum Brook Station

This photo is cropped from Pictometry

Glenn Research Center

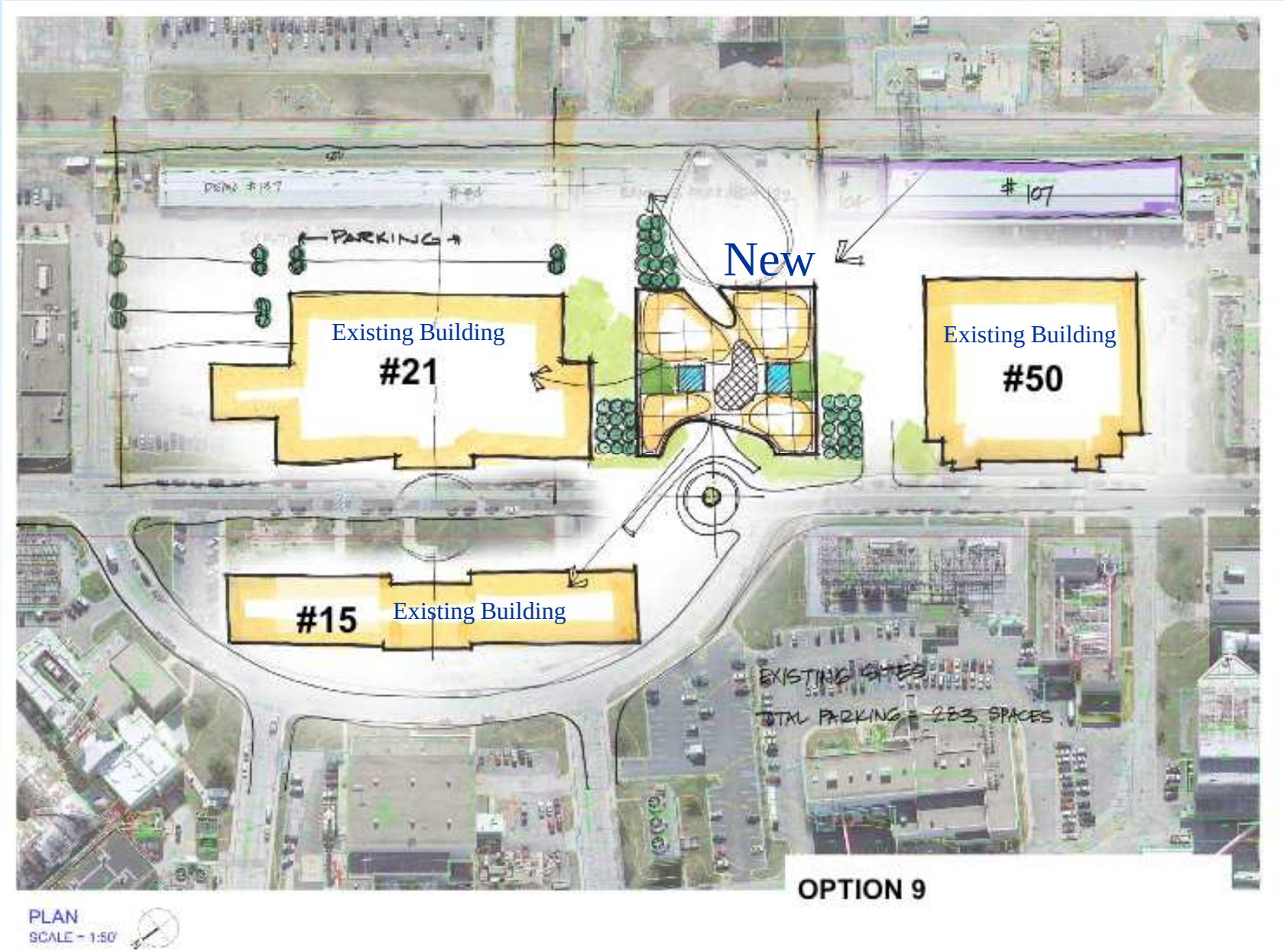
Lewis Field & Plum Brook Station



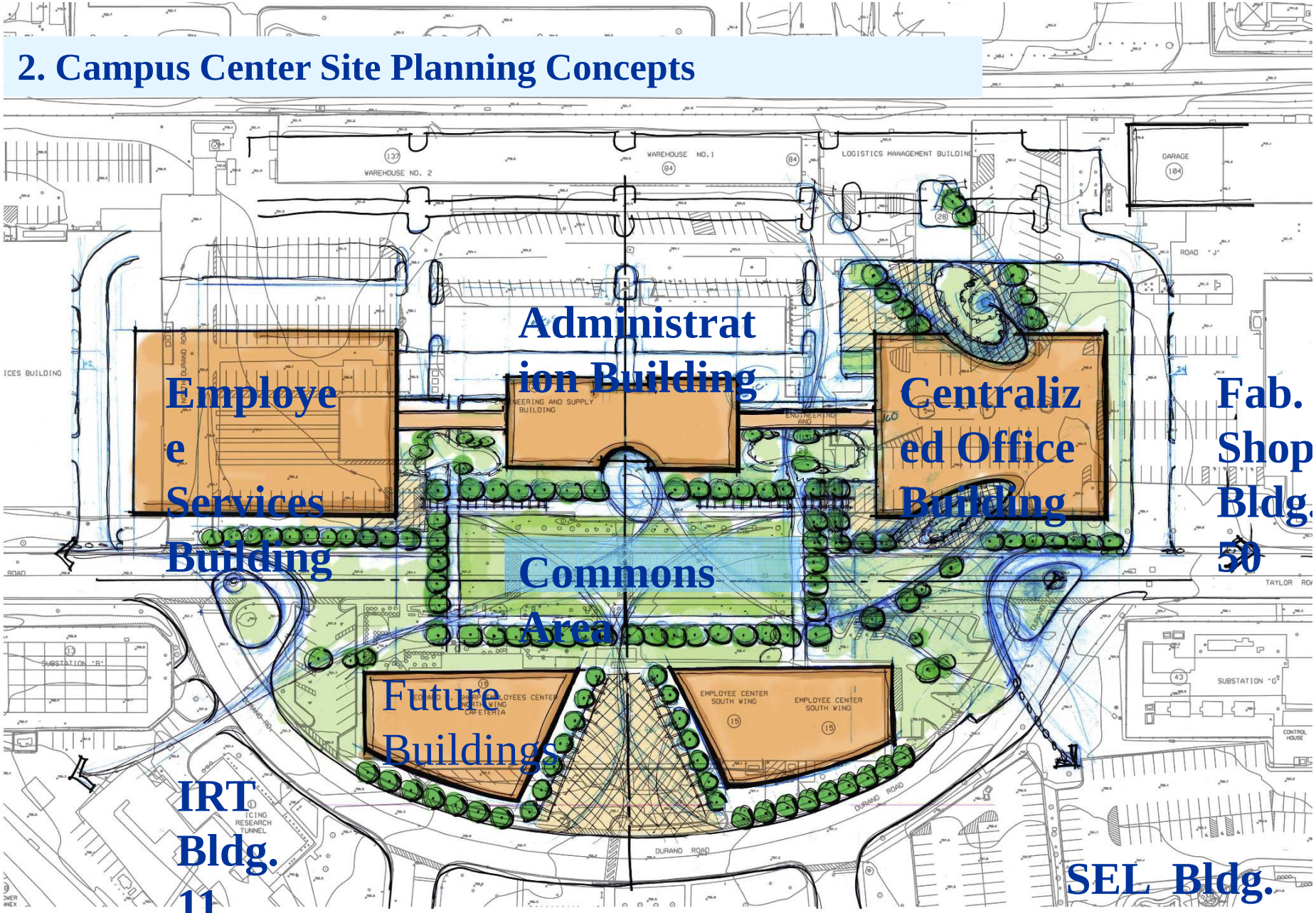
Planned Location for new Centralized Office Building

First step toward Glenn's Campus Center

Campus Center Site Planning



2. Campus Center Site Planning Concepts



Building Design Concepts

Glenn Research Center

G6QH9920

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Preliminary Design Review (PDR)

for the new

Centralized Office Building

Presented by Eric Patton
At the
May 14, 2009 Facilities Symposium

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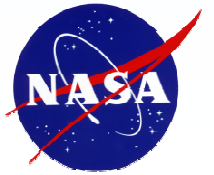


Project Goals and Requirements

Scope

- Provide a centralized office building to accommodate a minimum of 300+ desks in open and private offices featuring:
  - 6000 square foot 400 person flat floor auditorium
  - Conference Center with highly functional meeting rooms
  - Lobby space for displays, events, and gatherings

The project will include roadways, paved areas, underground utilities, and connection to institutional facility systems. The building area is programmed as approximately 80,000 to 90,000 gross square feet, three stories above grade, with at least 250 parking spaces.

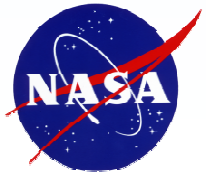
- A warehouse is also being designed in conjunction with the COB, but will not be covered in this PDR.

Budget

- FY2008 FP&D funding for design and commissioning
- FY2010 Construction funding $25.3M ($20.5M for COB, $4.4M for Warehouse, $0.4M for project reserve)
- FY2011/12 $4.7M of outfitting/activation costs requested from CM&O split over both years

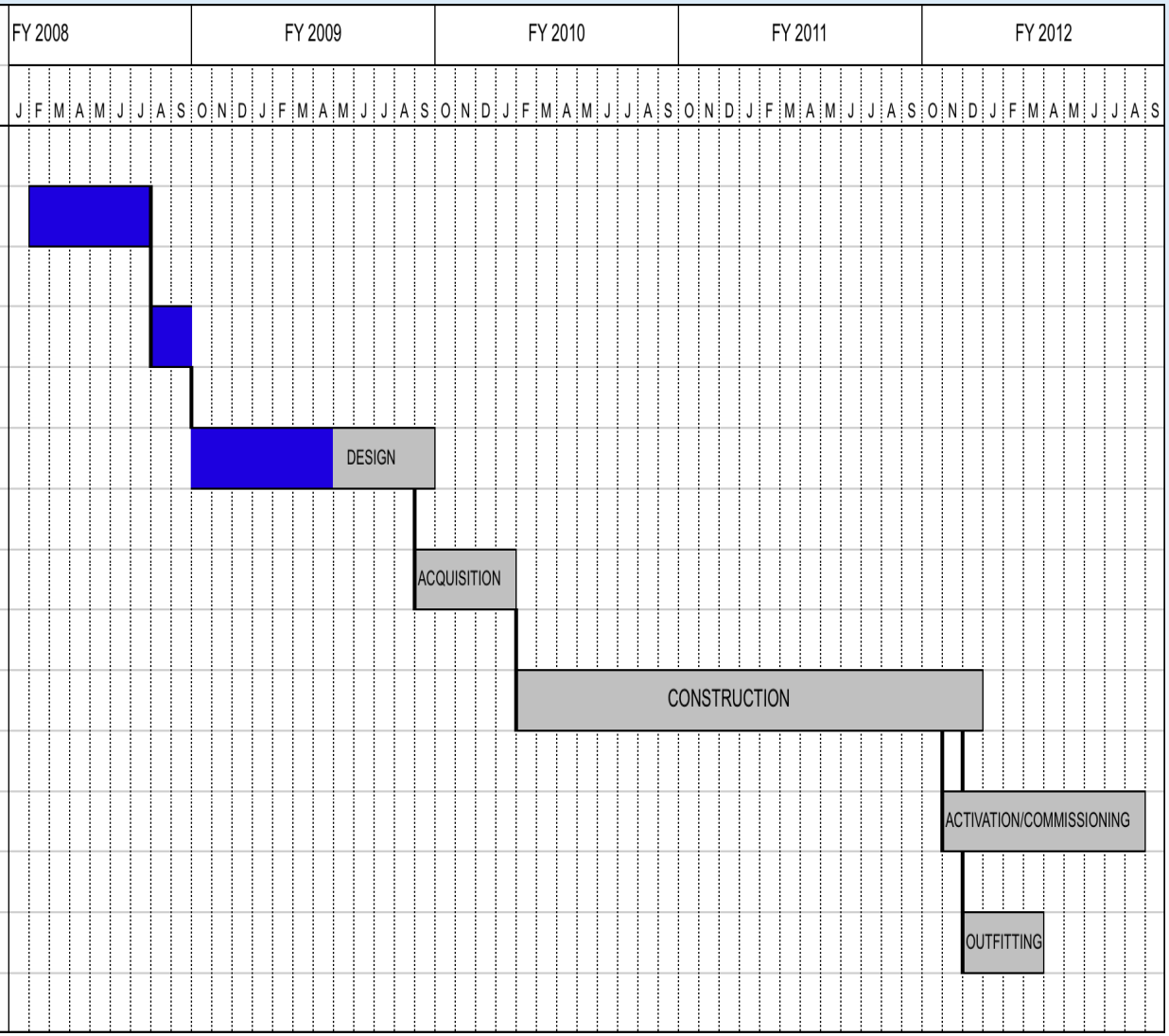
Schedule

Occupancy by Spring of 2012.



Schedule

Item	Description	Start	Complete	% Complete
1	A&E Board Action	Feb-09	Jul-09	100%
2	Procure Design Contract	Aug-09	Sep-09	100%
3	Final Design	Oct-09	Sep-09	30%
4	Acquisition	Sep-09	Jan-10	0%
5	Construction	Feb-10	Dec-11	0%
6	Activation / Commissioning	Nov-11	Aug-12	0%
7	Outfitting	Dec-11	Mar-12	0%



Project Goals and Requirements

Quality

- Needs to be functional but not a Cadillac yet inspirational
- COB must be a high performance building
- Prefer spending budget on higher quality office vs. warehouse

Safety

- Design for Safety (design decision criteria)
- No lost time accident during construction

Coordination

- Implement construction with minimal impact to GRC operations
- Buildings 21 and 50 remain open throughout although B21 South Loading dock to be closed.
- Ares and/or follow-on manufacturing needs truck access to B50 High Bay from north end.
- Demolition of B28, B84, B137 to create open site for allowable footprint, construction layout and staging and eventually parking.

Project Goals and Requirements

Leadership in Energy and Efficient Design (LEED)

- LEED “Silver” minimum
- A-E to balance LEED requirement with cost and quality; strive for “Gold”.
- Enhanced Commissioning

Building Information Modeling (BIM)

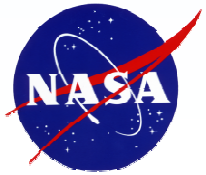
- Demonstrate use of technology as “pilot projects” for both COB and Warehouse.

NPR 8820

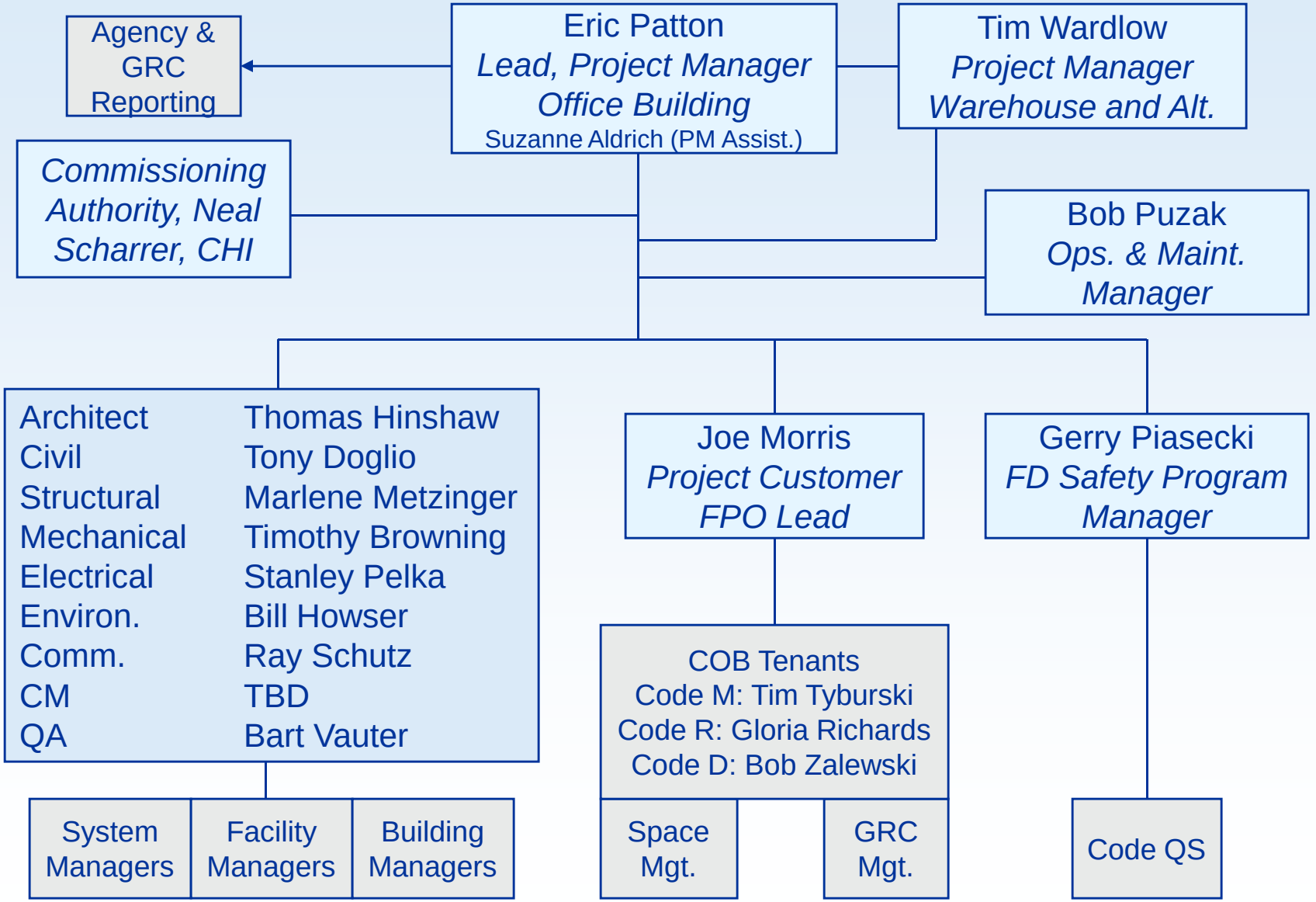
- Facility Project Management Plan (yet to be signed)
- Functional Requirements Document (signed off)
- Project Stakeholders
  - Code M, Space Flight Systems, Tim Tyburski
  - Code R, Research and Technology, Gloria Richards
  - Code D, Engineering, Bob Zalewski
- Project Definition Rating Index (PDRI)
  - First attempt scored at 456 prior to 30% design, anticipate less than 200 after 60%
- COB activation/outfitting
- Change Management

Change Management

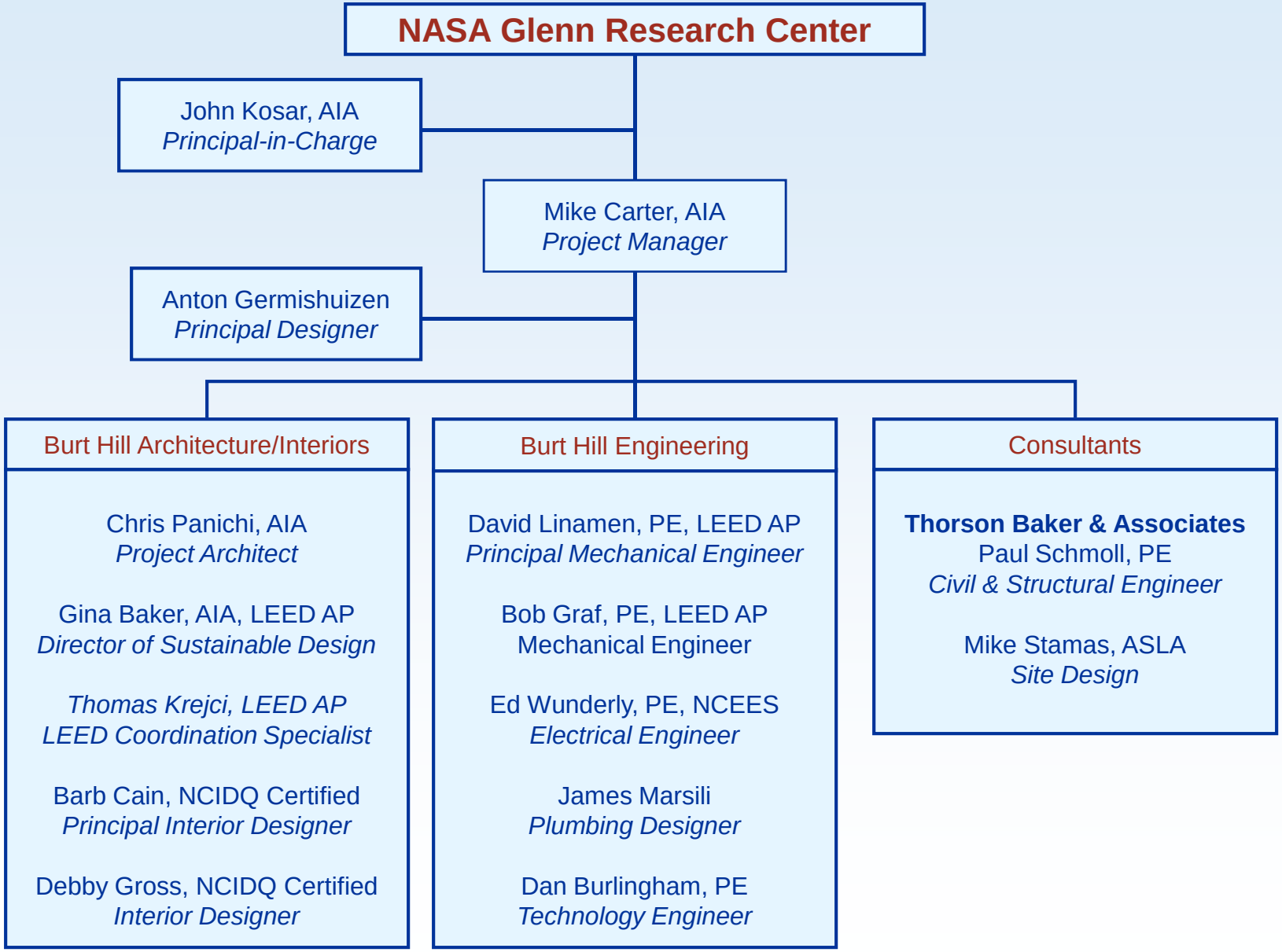
- Established and documented in the FPMP.
- Delegate decision-making as much as possible to the PM/Team
- Establish Change Control Board to approve all changes that impact cost by > $100K or schedule by > 30 days.
- CCB membership consists of GRC Facilities Division Leadership Team:
  - Dallas Lauderdale, Chairman
  - Rick Danks, Alternate
  - Jim Onest, Operations Management Branch
  - Renee Palyo, Engineering Management Branch
  - Joe Morris, Facilities Planning Office
  - Joe Torri, Systems Management Branch
  - Gene Stygles, Project Management Branch
  - Mark Woodling, Program Management Office



NASA Team Structure



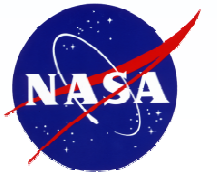
A&E Team Structure



Introduction of Burt, Hill

- Burt, Hill is a full service, international design firm with 13 offices worldwide
- Over 900 employees.
- The firm has a specialty in Science related projects.
- A strong commitment to sustainability
  - Charter member of USGBC
  - CEO Harry Gordon was the first Architect to join the USGBC
  - Harry and Sustainability Director Gina Baker serve on the USGBC committee that write the LEED standards
  - Burt, Hill was part of the team that did the “Greening of the Whitehouse” project
  - Nine LEED certified buildings and over 35 registered.
- Firm wide commitment to BIM
  - Completing a 3year program to deploy BIM on 95% of projects
  - Beta testers for Revit software
  - Integrated design process

- Mike Carter is the Project Manger as well as the practice leader of the Cleveland office
  - 30 years experience in the practice of Architecture as a RA
  - Graduate of Miami University
    - Bachelor degree in Architecture
    - Masters Degree in Environmental Planning



Preliminary Design Review

Presented by Mike Carter

BURT, HILL

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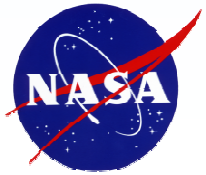

Design Process

- **Review Program prepared by NASA GRC team**
- **Discovery Workshop**
  - Gather available data
    - Utilities
    - Environmental Information
  - Discuss adjacencies/functionality
  - Visual Listening
  - Design charrette
  - LEED workshop
- **Re-visit the master plan**
  - Focus on Central Quad

Pre-Design Process

- **Develop design using BIM to greatest extent possible**
  - Revit as design and energy modeling tool
- **Begin Energy Modeling Development**
  - Design is influenced by modeling of day lighting and energy usage

NASA Master Plan

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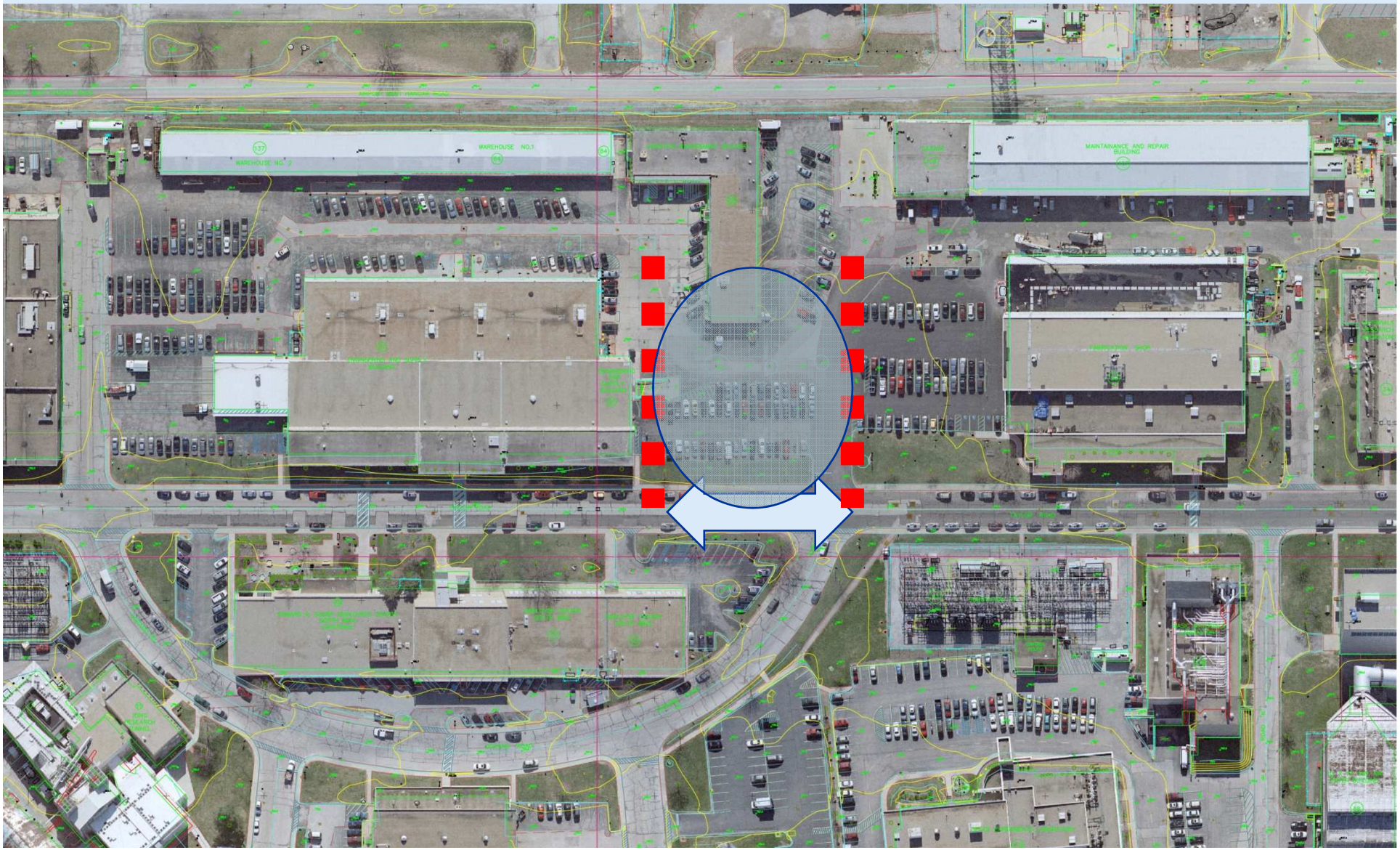

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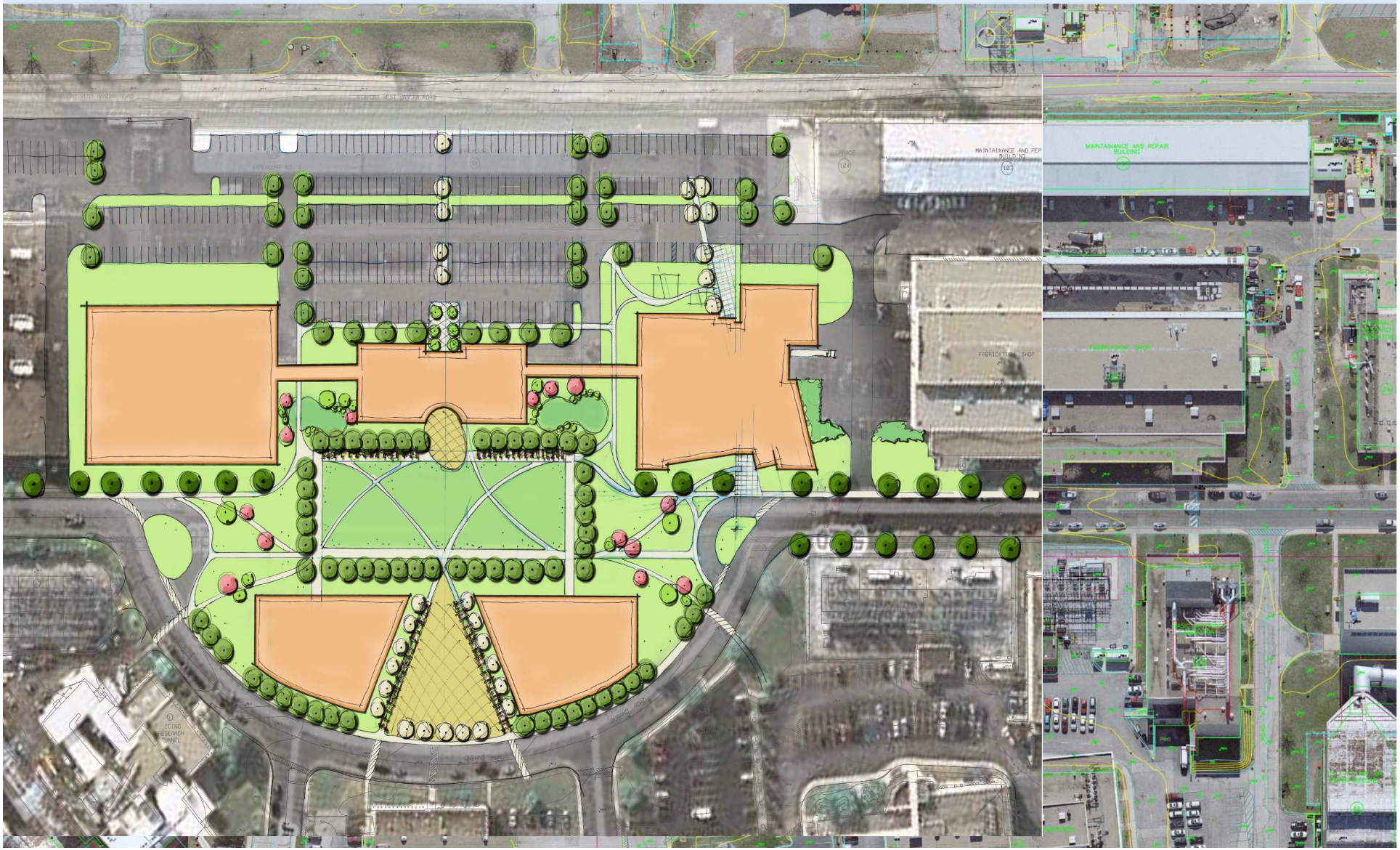

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Program

Area	SIZE L	x	W	UNIT N.S.F.	CIRC. N.S.F.	UNIT U.S.F.	REQ'D QTY.	TOTAL U.S.F.	Comments
Entry									
Entry Vestibule	10	x	15	150	54	204	2	408	
Lobby	100	x	30	3,000	264	3,264	1	3,264	Size offers more opportunities for display space and Conference Center pre-function.
TOTAL Usable Square Footage								**3,672**	
Offices Areas									
Small Workstation	7	x	9	63	36	99	253	25,047	Amount of secondary circulation provided in NASA program is not required.
Large Workstation	9	x	10.5	95	43	138	30	4,125	Amount of secondary circulation provided in NASA program is not required.
Director Office	10	x	15	150	54	204	15	3,060	
Supervisor Office	10	x	12.5	125	49	174	20	3,480	
Division Suite Reception (Support Staff)	10	x	25	250	74	324	5	1620	
Workroom	10	x	18	180	60	240	10	2,400	
Collaboration Room (4 Seats)	10	x	10	100	44	144	12	1728	Requires additional space to accommodate 4 people and layout space.
Small Conference Room (6 Seats)	10	x	12	120	48	168	5	840	Requires additional space to accommodate 6 people.
Large Conference Room (25 Seats)	20	x	24	480	92	572	5	2,860	Requires additional space to accommodate 25 people.
VITS Conference Room	15.5	x	21	326	77	403	3	1208	Size assumes layout shall match existing, with chairs around perimeter of room.
Collision / Break-Out Area	6	x	6	36	28	64	8	512	As discussed during design charrette.
TOTAL Usable Square Footage								**46,880**	
Conference Center									
Auditorium (400 Seats)	60	x	100	6,000	0	6,000	1	6,000	Assumes "lecture style" seating layout. Tables will require additional space.
A/V Projection Room	12	x	20	240	68	308	1	308	
Small Conference Room	15	x	20	300	74	374	4	1496	
Medium Conference Room	20	x	44	880	132	1012	1	1012	
Large Conference Room	20	x	86	1720	216	1936	1	1936	
VITS Conference Room	12	x	34	408	96	504	1	504	
Catering Kitchen	14	x	20	280	72	352	1	352	
Coffee / Vending	10	x	20	200	64	264	1	264	
Registration / Information	10	x	18	180	50	180	1	180	
Business Center	8	x	8	64	36	100	1	100	Typically required by Conference Center occupants. May be located adjacent to Registration.
Break-Out Areas	10	x	10	100	44	144	2	288	Typically required by Conference Center occupants.
Coat Room	16	x	20	320	76	396	1	396	Assumes 50% of Conference Center occupants are located within COB x 3" per coat.
Chair / Table Storage	20	x	36.5	730	117	847	1	847	May require additional space depending on furniture sizes, stacking capability and cart sizes.
Conference Material Storage	6.25	x	8	50	33	83	2	165	
TOTAL Usable Square Footage								**18,848**	

Program

Common Spaces									
Toilet Rooms (Men's and Women's)	16	x	30	450	94	544	8	4,352	Two per floor, with Office Area.
Shower / Dressing Room	10	x	10	100	44	144	2	288	Rooms are ADA compliant and include toilet, lavatory and shower.
Coffee / Vending	10	x	12.5	125	49	174	3	522	One per floor.
Storage	3	x	8	24	26	50	4	200	
Receiving	10	x	25	250	74	324	1	324	As discussed during design charrette.
Housekeeping / Janitorial	8	x	8	64	36	100	3	300	One per floor.
Mechanical Spaces and Chases	55	x	100	5,500	314	5,814	1	5,814	
Additional MEP Spaces	30	x	50	1500	164	1664	1	1664	Larger Electrical Rm, separate Generator Rm. and additional mechanical spaces may be require
Electrical Rooms	5	x	8	40	30	70	6	420	Two closets per floor.
Elevator Machine Room	10	x	10	100	44	144	1	144	
Data / Communication Rooms	10	x	10	100	44	144	3	432	One per floor.
Server Room	6	x	10	60	36	96	3	288	One per floor.
Building Stair	10	x	20	200	64	264	6	1584	Two per floor.
Elevators	10	x	30	300	84	384	3	1152	One bank per floor.
TOTAL Usable Square Footage								17,484	

Sub-total	81884
Primary Circulation Factor (10%)	8,188
Total	90,072

GENERAL NOTES:
Primary circulation is 10% of program sub-total.
Secondary circulation is included in Usable Square Foot Totals.
Three floors are assumed for the time being.
Double height space of Lobby and Auditorium may affect Program Total.
Atrium floor space has not been accounted for in Program Total
Usable green roof may be added for additional Meeting and Collaboration Spaces.

Visual Listening

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Sustainable Design

LEED 2.2 Checklist Summary

	Possible	Probable	Potential	Not Possible
Sustainable Sites	14	8	5	1
Water	5	3	1	1
Energy & Atmosphere	17	11	4	2
Conserving Materials & Resources	13	4	4	5
Enhance Indoor Environmental Quality	15	11	3	1
Innovation in Design	5	2	3	0
Totals	69	39	17	10

Certified	26-32 points
Silver	33-38 points
Gold	39-51 points
Platinum	52+ points

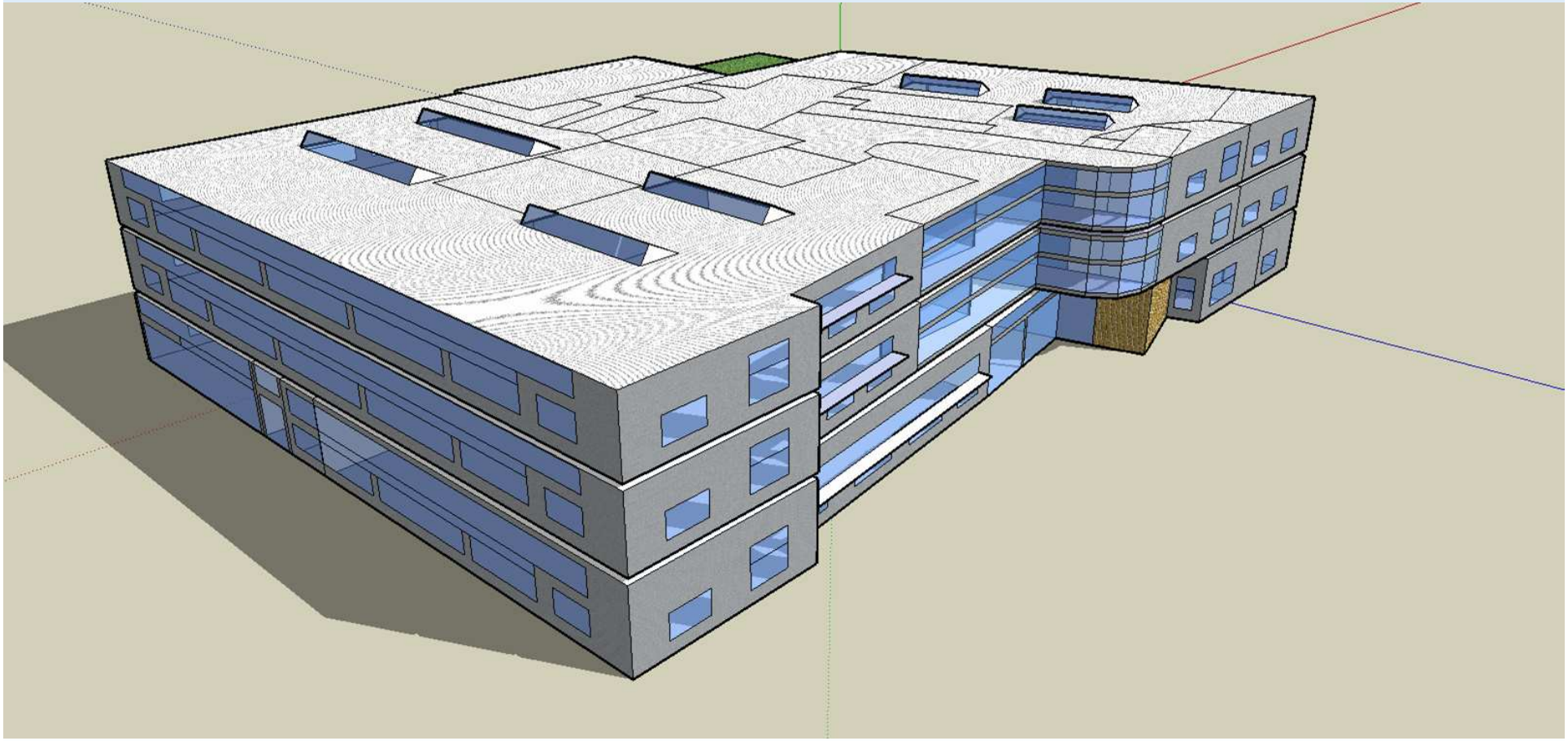
LEED Certified 26 – 32
Silver 33 – 38
Gold 39 – 51
Platinum 52 or more

Energy Modeling Strategy

- Daylighting and Energy Efficiency should drive design
- Maximize North Lighting
- High Efficiency skin strategy
- Incorporate BIM and IES

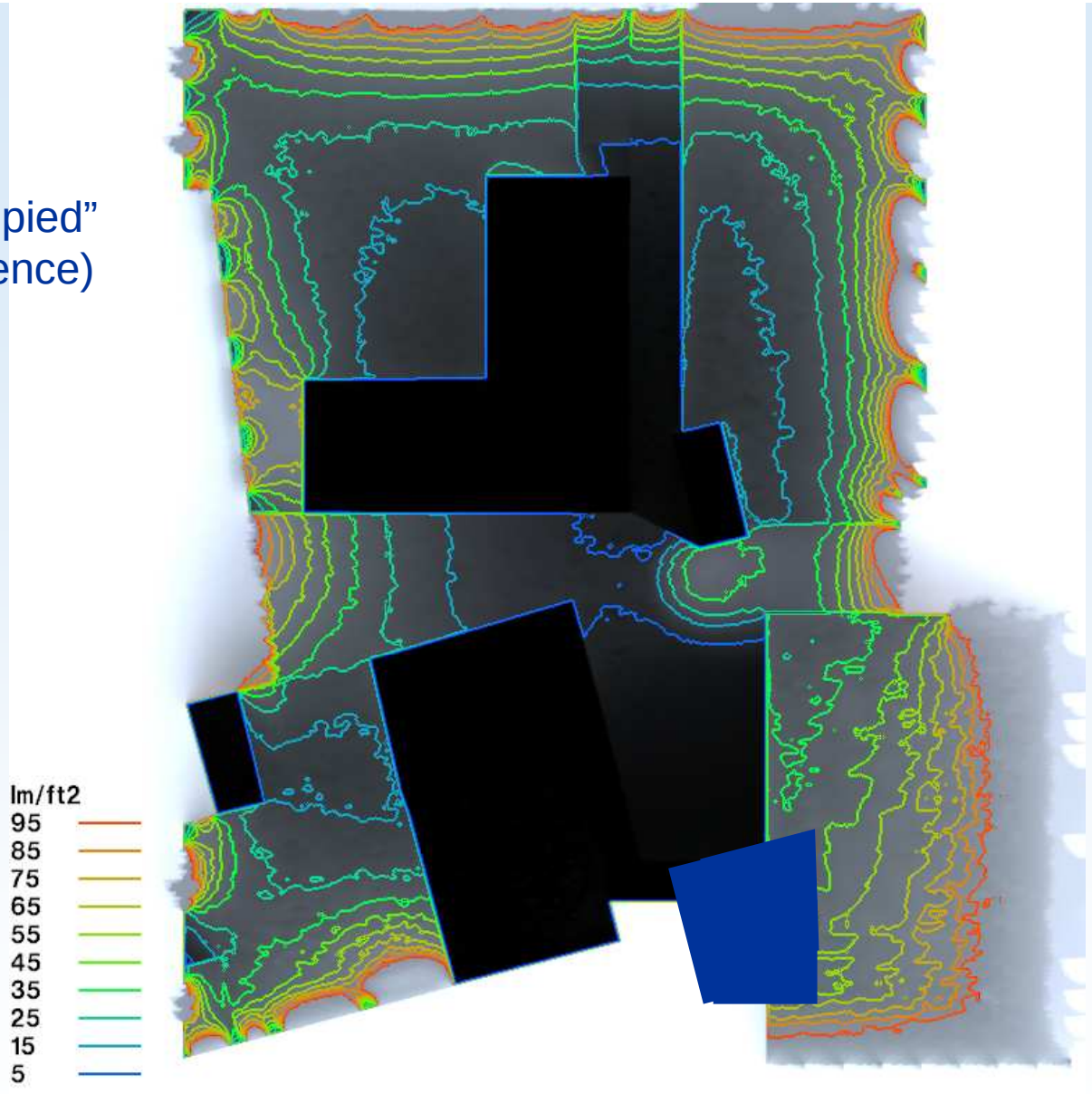
Total Building

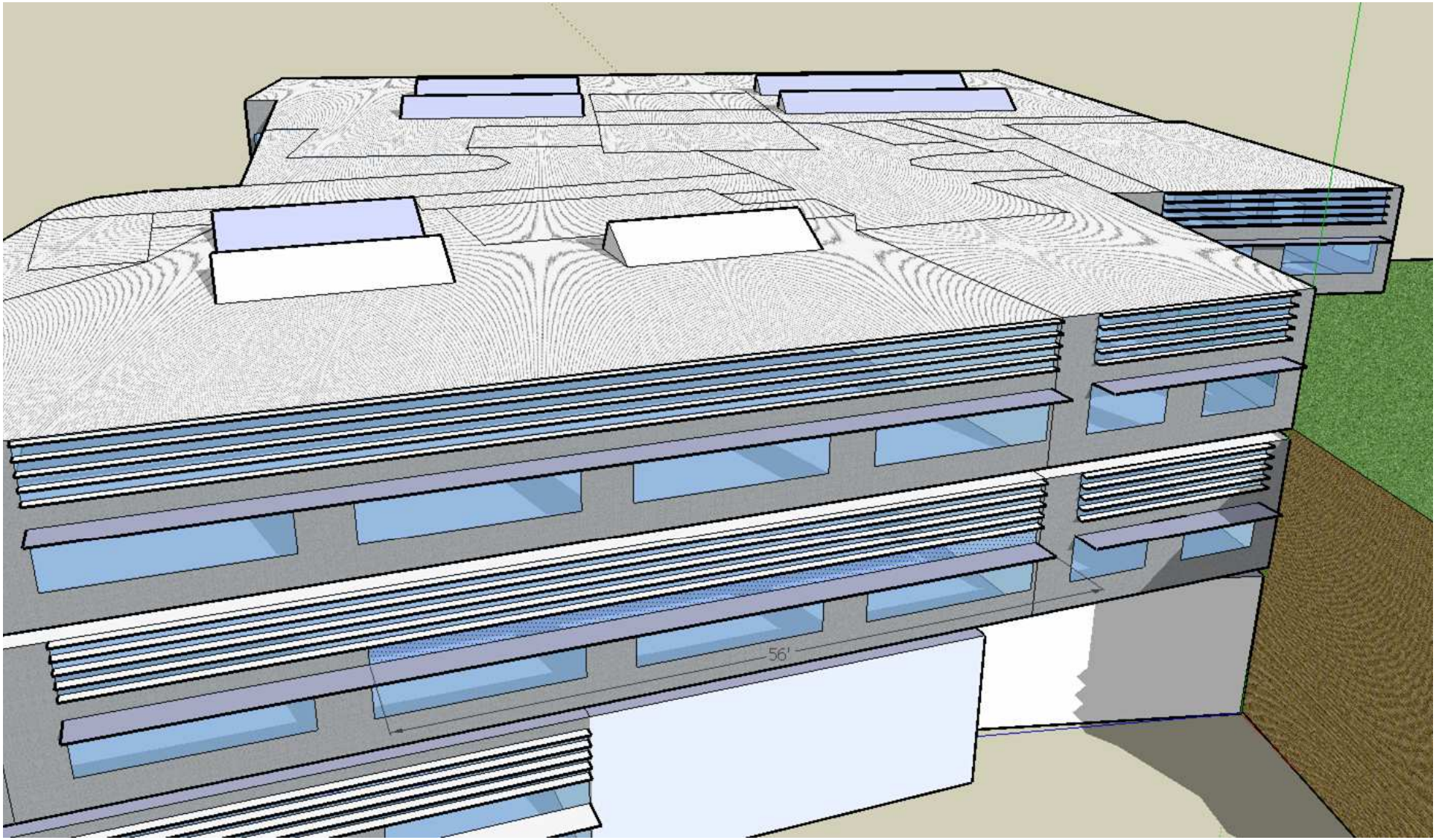
42,300 sf External Wall
Vertical Glazing, 49% of Wall



1st Floor
57% above 25fc

25,500 sf “regularly occupied”
(Lobbies, offices, conference)





The effect of adjusting middle window size was studied for the 2nd Floor South Open Office

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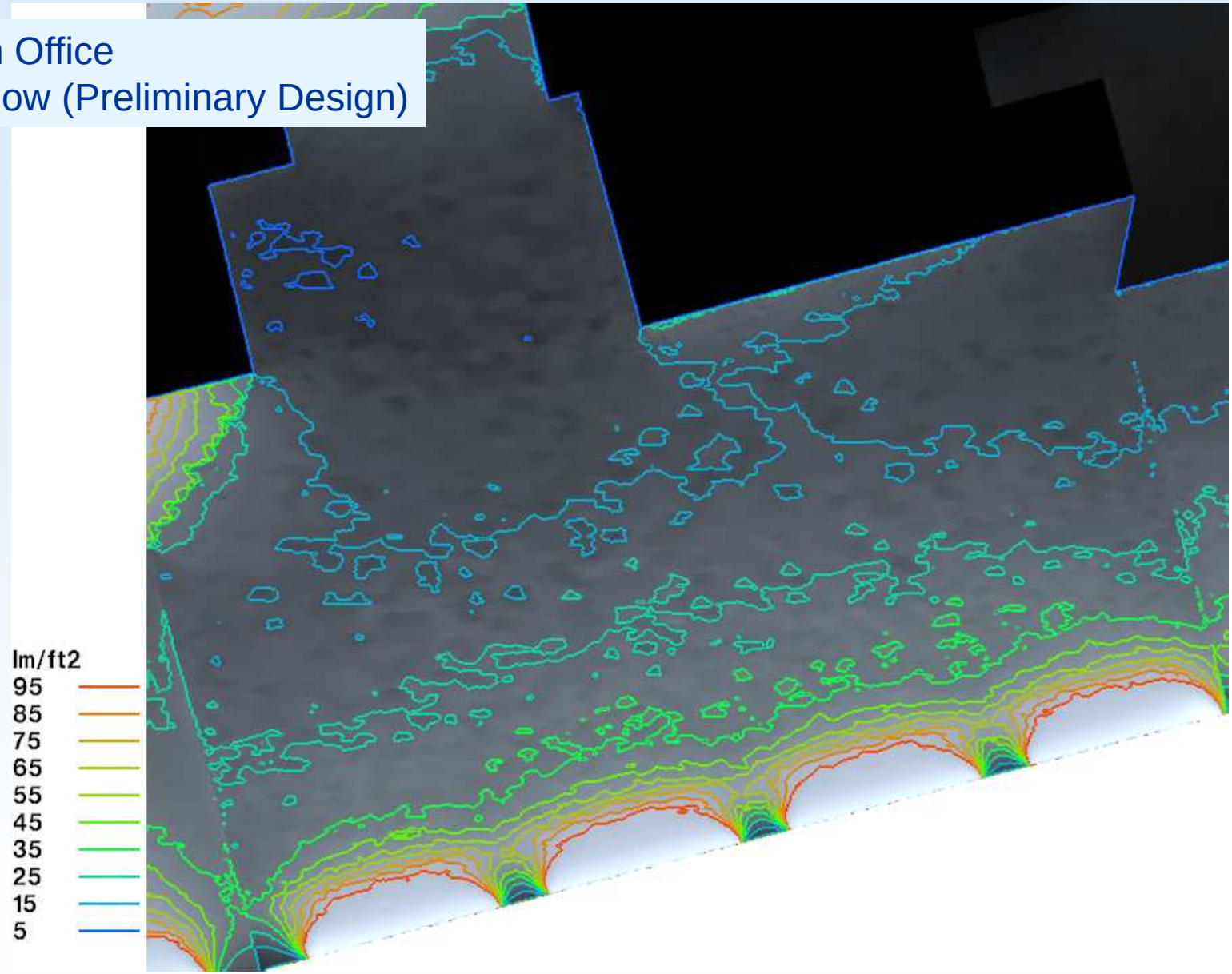
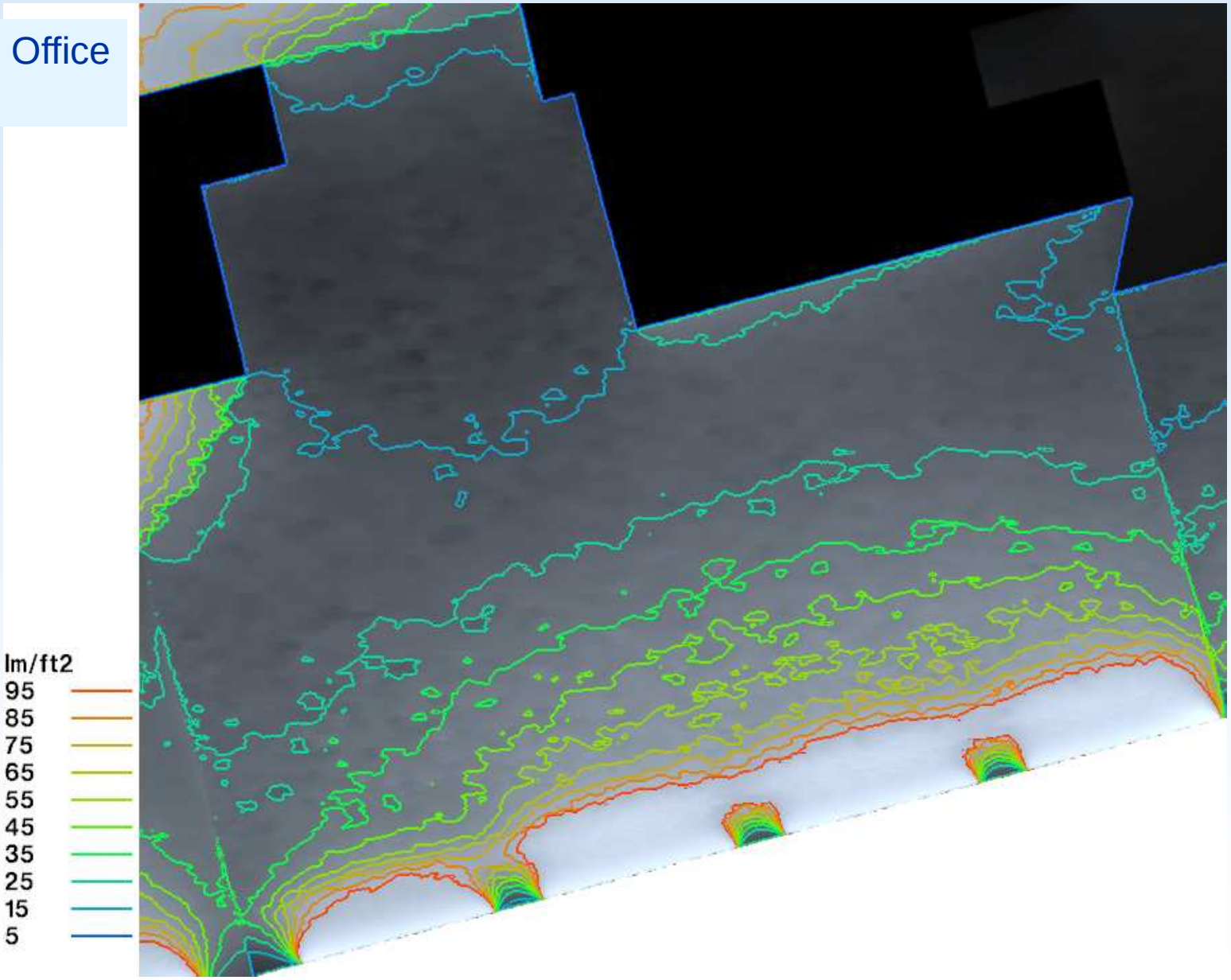
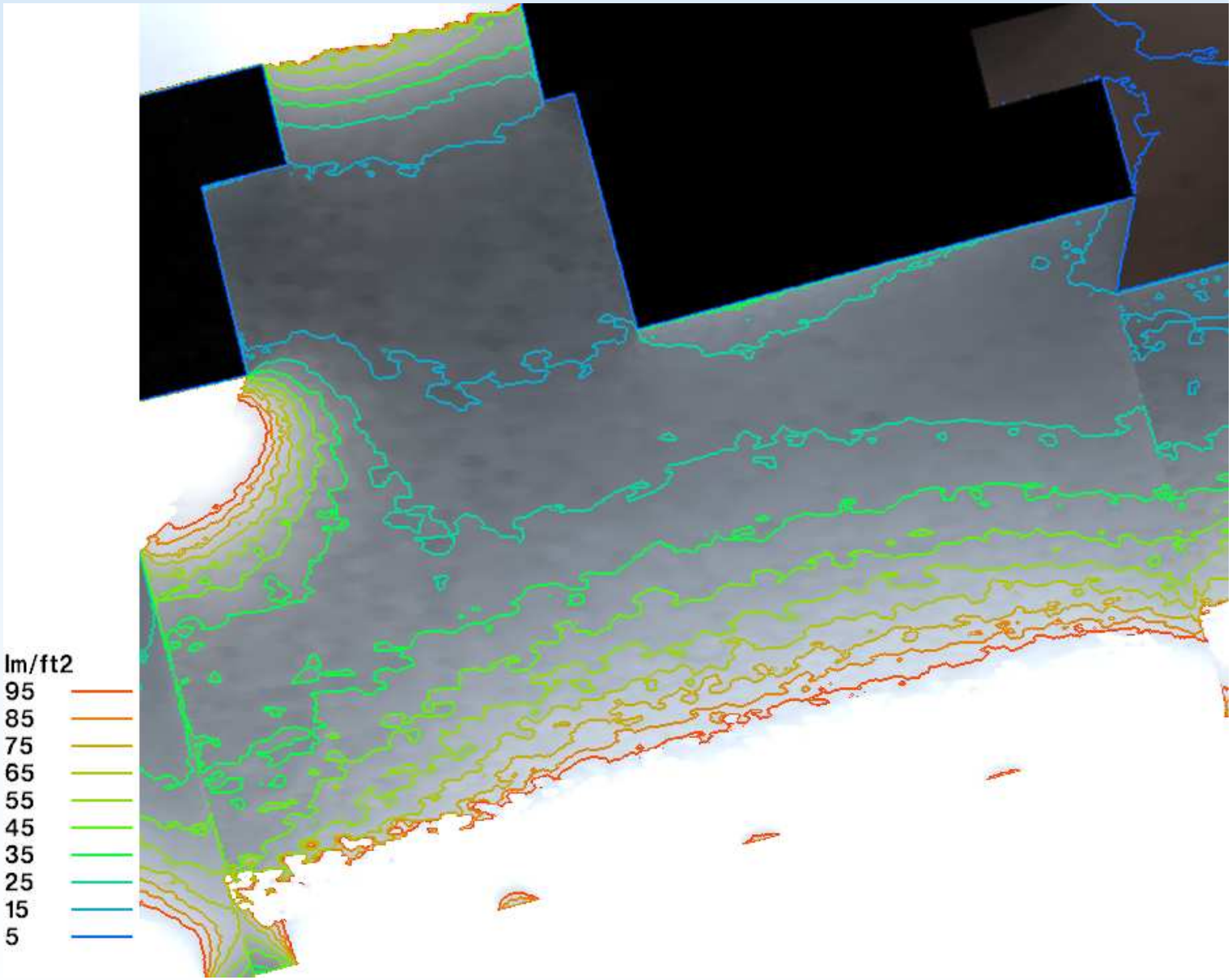
2nd Floor South Office
No middle Window (Preliminary Design)



2nd Floor South Office 56ft Window



56ft Window
Sunny



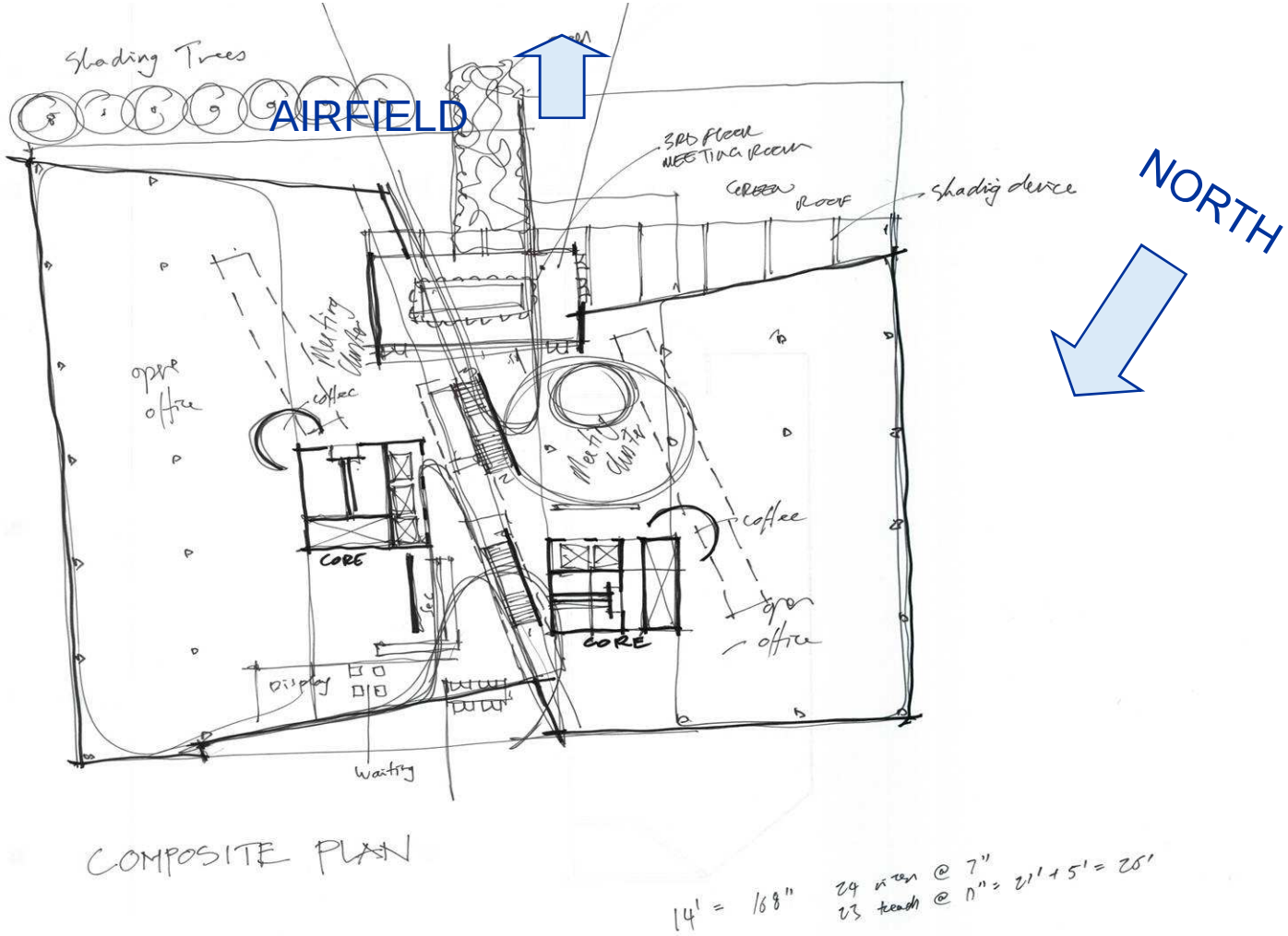
Summary

- **Preliminary Daylight Fenestration Design**
  - 53% occupied space above 25fc
    - Does not fulfill LEED EQ credit 8.1
  - Vertical Glazing 49% of External Wall
    - Exceeds ASHRAE Baseline

- **Focus daylight harvesting on lobby areas**
  - Lower light levels are required
  - Central light well

- **Daylight office perimeters as much as possible without exceeding 40% total glazing area**
  - Minimize East and West glazing
  - Maximize daylight harvesting on 3rd floor with Skylights
  - Slope ceilings over 15ft perimeter (13ft down to 10ft)
  - Use dimming ballasts only within 20ft perimeter

BLDG. 21



TAYLOR ROAD

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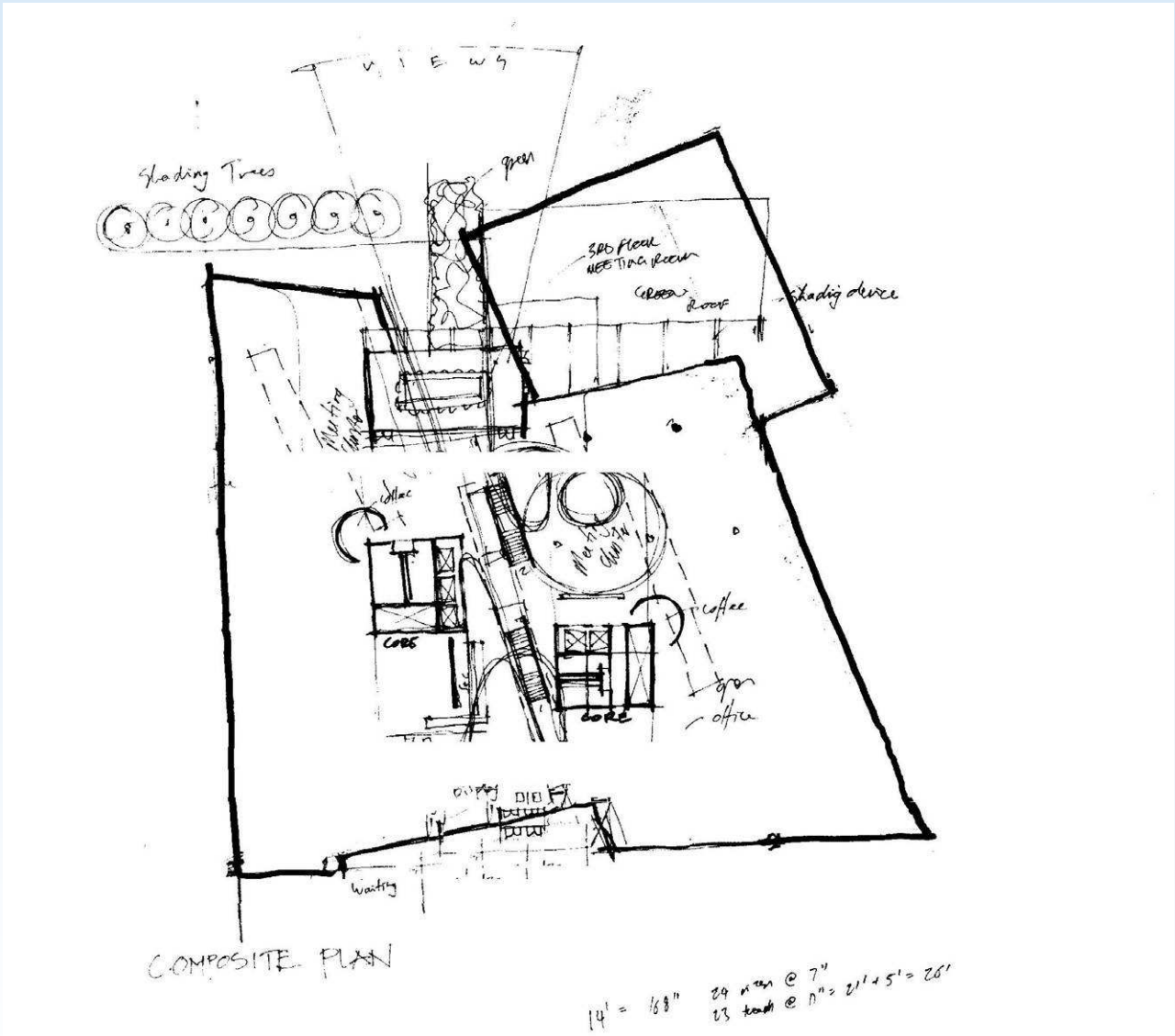

VIEWS
Shading Trees
green
3RD FLOOR
MEETING ROOM
CROSS
ROOF
shading device
cadlac
COBS
coffee
CORE
typ
office
waiting
COMPOSITE PLAN

1 FIRST FLOOR BLOCK PLAN - 33,773 GSF

NTS

APRIL 21, 2009

LEGEND:

CORE / COMMON AREA

CONFERENCE CENTER

OFFICE AREA (FULL HEIGHT PARTITIONS)

1 SECOND FLOOR BLOCK PLAN - 28,319 GSF (27,386 SF MINUS VOIDS)
NTS

APRIL 21, 2009

LEGEND:

CORE / COMMON AREA

CONFERENCE CENTER

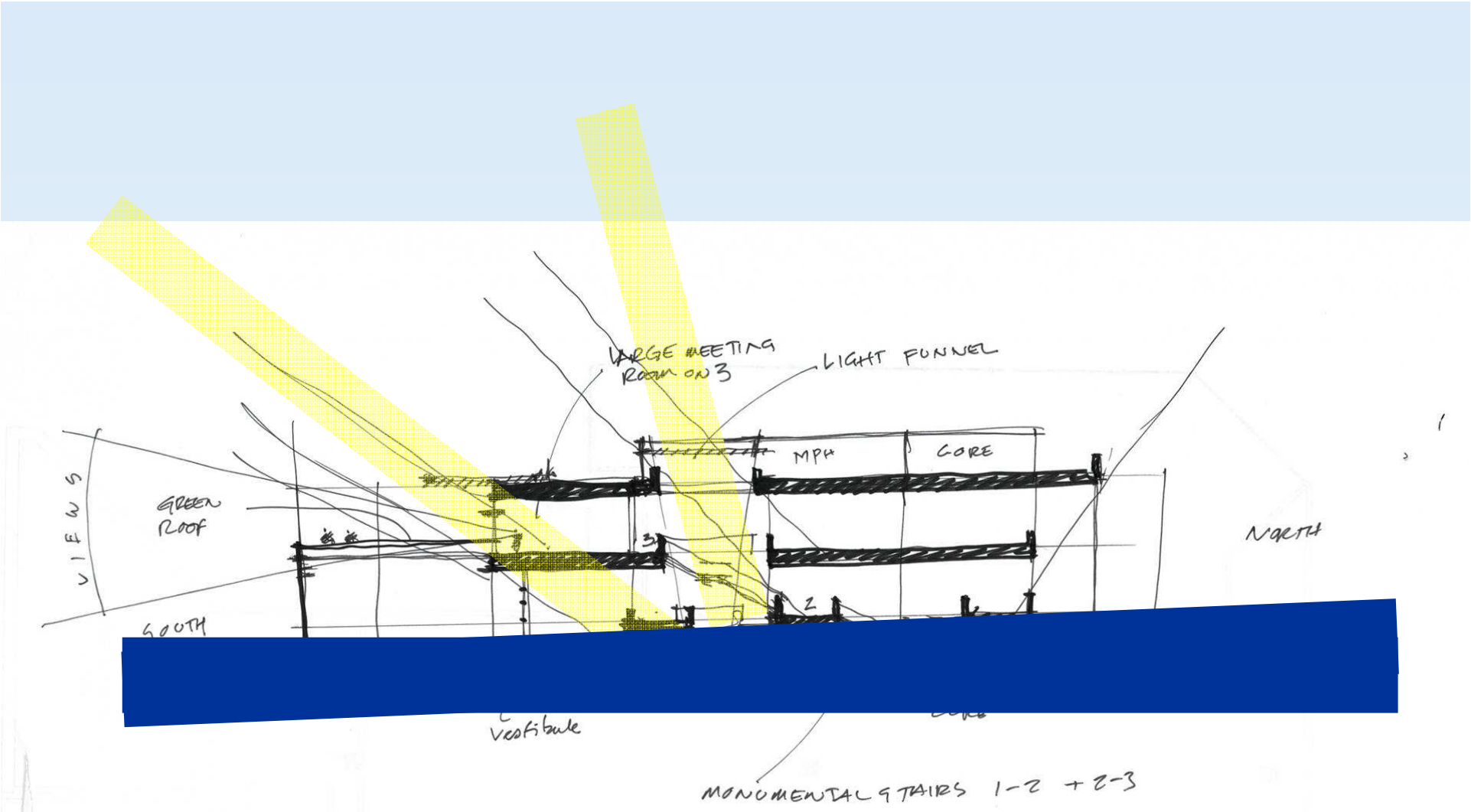
OFFICE AREA (FULL HEIGHT PARTITIONS)

1 THIRD FLOOR BLOCK PLAN - 29,635 GSF (28,929 SF MINUS VOIDS)

NTS

APRIL 21, 2009

LEGEND:


LARGE MEETING ROOM ON 3
LIGHT FUNNEL
MPH
CORE
VIEWS
GREEN ROOF
NORTH
SOUTH
3
2
Vestibule
MONUMENTAL STAIRS 1-2 + 2-3

View from West

View from East

View of Lobby looking east

Questions